(12) UK Patent Application (19) GB (11) 2 163 805 A

(43) Application published 5 Mar 1986

(21) Application No 8419834

(22) Date of filing 3 Aug 1984

(51) INT CL[4]
F16B 1/00 7/22

(52) Domestic classification
E2A 106 163 412 MA
U1S 1933 E2A

(56) Documents cited
None

(58) Field of search
E2A

(71) Applicants
Kar Heing Chew,
No. 16 Fair Park Road, Ipoh, Perak, Malaysia,
Mackenzie Richard Dowling,
No. 106 Persiaran Tambun, Ipoh, Perak, Malaysia

(72) Inventors
Kar Heing Chew,
Mackenzie Richard Dowling

(74) Agent and/or address for service
Frank B. Dehn & Co., Imperial House, 15—19 Kingsway, London WC2B 6UZ

(54) Latching mechanism

(57) A remotely operable latching mechanism for securing a load to a support against the influence of gravity and for releasing it when desired, such mechanism comprises a stationary support structure 1, a movable carrying member 2 which is raisable and lowerable relative to the said support structure from a remote location and is adapted to support the said load, and a latching member 3 pivotally mounted on the said carrying member and engageable with the said support structure, the latching member being arranged (a) to make automatic load-supporting latching engagement with the support structure upon a first upward movement of the carrying member relative to the support structure from an initial unlatched position to a latching position, (b) to swing automatically to a released position relative to the support structure upon a second such upward movement of the carrying member from the said latching position to an automatic release position and (c) to be positively moved to said released position by abutment with the support structure upon a third upward movement of the carrying member from the said automatic release position to a positive release position, if the latching member has not already moved automatically to its released position as aforesaid.

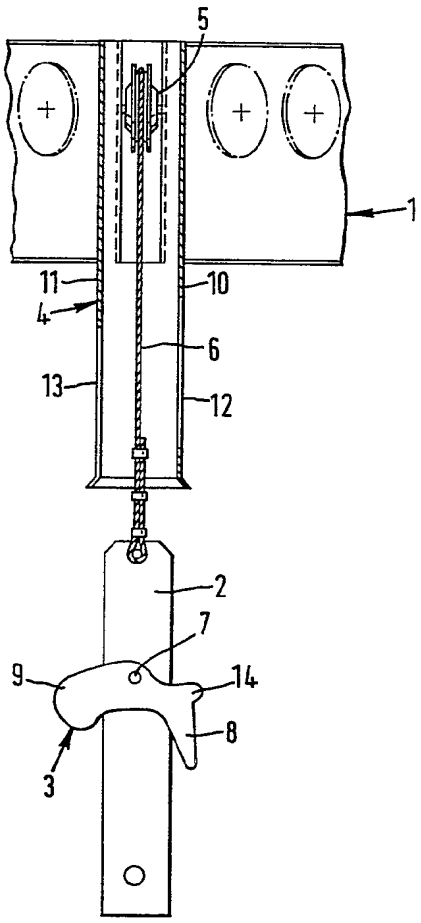

FIG.1

GB 2 163 805 A

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

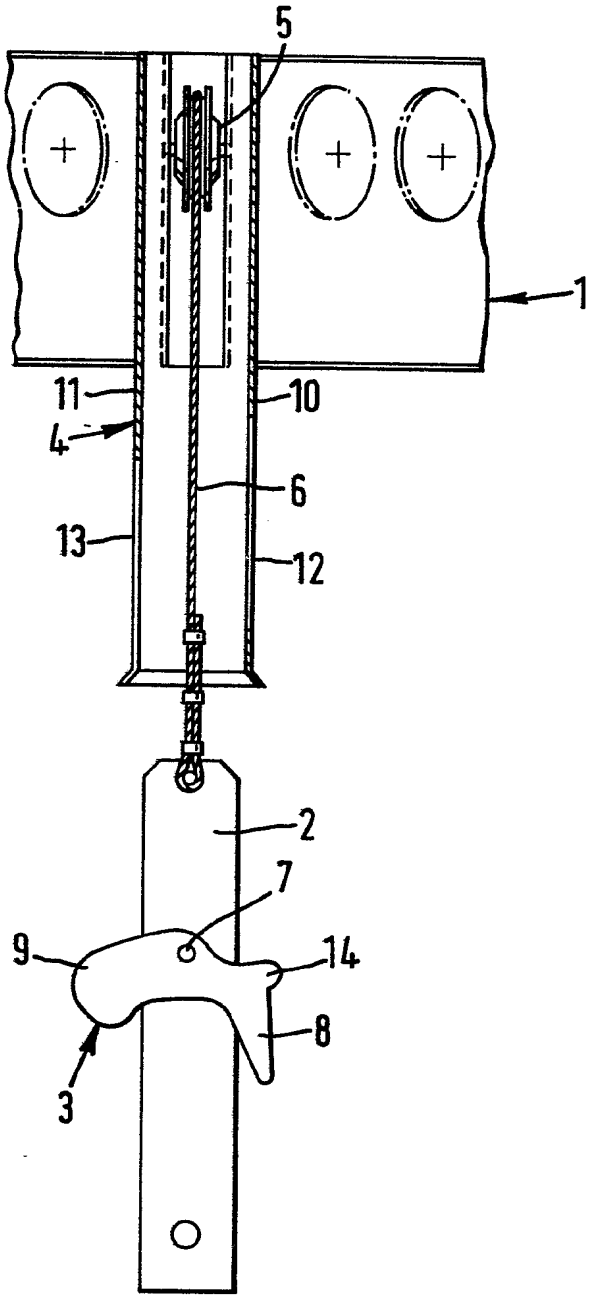

FIG.1

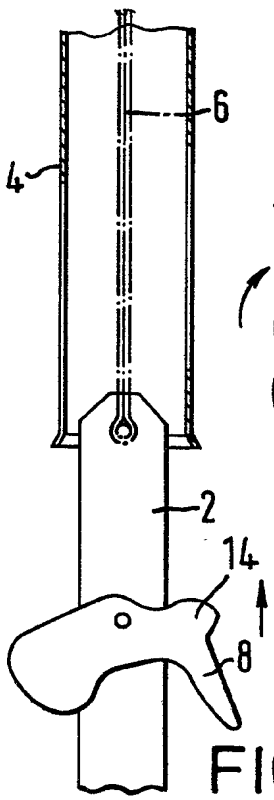

FIG.2

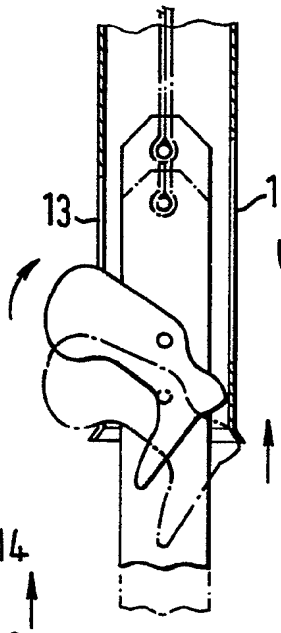

FIG.3

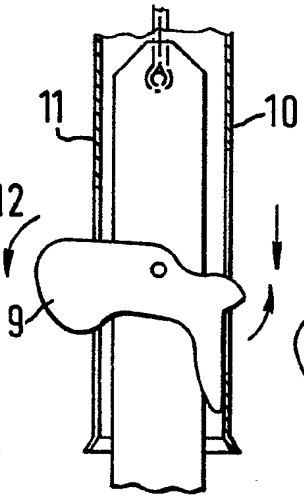

FIG.4

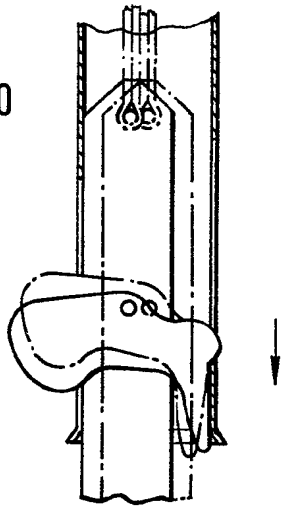

FIG.5

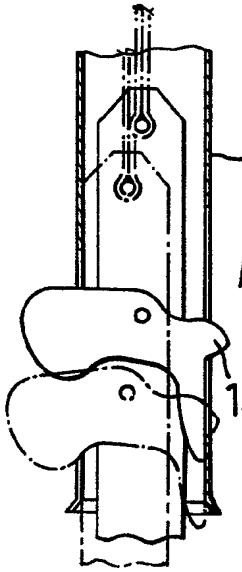

FIG.6

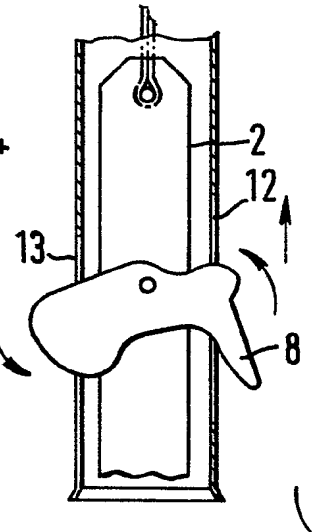

FIG. 7

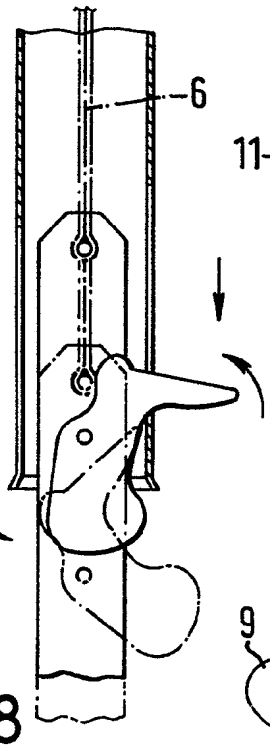

FIG. 8

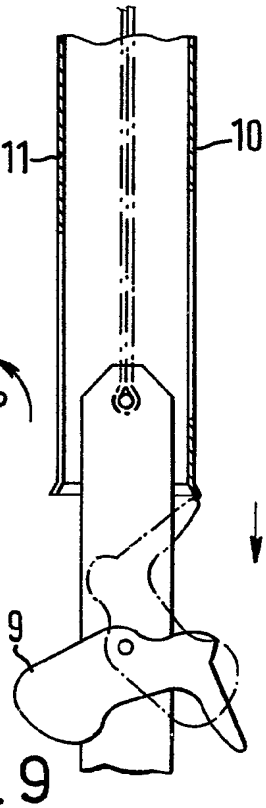

FIG. 9

SPECIFICATION

Latching mechanism

This invention relates to a remotely operable latching mechanism for securing a load to a support against the influence of gravity and for releasing it when desired. A typical but non-limiting example of the use of such a latching mechanism is to secure a load which in its operating position is located at the top of a mast or tower but is required to be lowered to ground level occasionally, e.g. for servicing. In such circumstances the provision of a remotely operable latching mechanism enables the load to be positively secured to, and released from, support means at the top of the mast or tower, by an operator at ground level, so that the tension on hoisting means such as one or more cables may be relieved whilst the load is in use.

Various forms of remotely operable latching mechanism have been proposed for this purpose, but they all suffer from various disadvantages, of which a primary one is a tendency to jam in their latched condition, usually due to foreign matter obstructing the mechanism after it has remained undistributed for a while.

According to the present invention there is provided a remotely operable latching mechanism for securing a load to a support against the influence of gravity and for releasing it when desired, such mechanism comprising a stationary support structure, a movable carrying member which is raisable and lowerable relative to the said support structure from a remote location and is adapted to support the said load, and a latching member pivotally mounted on the said carrying member and engageable with the said support structure, the latching member being arranged (a) to make automatic load-supporting latching engagement with the support structure upon a first upward movement of the carrying member relative to the support structure from an initial unlatched position to a latching position, (b) to swing automatically to a released position relative to the support structure upon a second such upward movement of the carrying member from the said latching position to an automatic release position and (c) to be positively moved to said released position by abutment with the support structure upon a third upward movement of the carrying member from the said automatic release position to a positive release position, if the latching member has not already moved automatically to its released position as aforesaid.

With such an arrangement, if the intended automatic movement of the latching member to its released position upon said second upward movement of the carrying member does not occur, for example because the intended swinging movement of the latching member is obstructed by foreign matter, the said third upward movement of the carrying member causes the latching member to be positively moved to its released position by abutment thereof with the support structure, thereby clearing the obstruction.

In a preferred form of the invention the said latching member has a latching nose on one side of its pivotal mounting for latching engagement with the support structure, and a counterweight portion on the other side of its pivotal mounting for automatically swinging the said nose to said released position.

Preferably the said support structure is then formed with a first vertical slot, closed at its lower end, for receiving the said nose of the latching member, the said nose engaging the lower end of the slot in its said latching position. The support structure may then be formed with a second vertical slot, closed at its upper end, for receiving the said counterweight portion of the latching member, the said counterweight portion abutting the upper end of the said second slot upon said third movement of the carrying member. Preferably the said first and second slots are formed in opposite wall portions of a vertical tubular member forming part of the said support structure, in which tubular member the said carrying member is raisable and lowerable as aforesaid.

Preferably the said carrying member is adapted to have the said load suspended therefrom, and the said support structure may then include at least one pulley for receiving a cable or the like for raising and lowering the said carrying member.

Apparatus including the above described latching mechanism may comprise a mast or tower incorporating the said support structure of the latching mechanism at an elevated position thereon. Such a mast or tower may include a plurality of said latching mechanisms adapted to support a common load, such as a flood-lighting system for example.

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic elevation, partly in cross-section, of a latching mechanism according to the invention;

Figures 2 to 5 show successive stages in the latching operation of the mechanism of Figure 1; and

Figures 6 to 9 show successive stages in the unlatching operation.

Referring first to Figure 1 the latching mechanism comprises a stationary support structure generally indicated at 1, a carrying member 2 which is raisable and lowerable relative to the support structure 1, and a latching member 3 pivotally mounted on the carrying member 2.

The support structure indicated at 1 is, in this embodiment, part of a head frame assembly for mounting at the top of a tall mast (not shown) to support a load in the form of a flood-lighting system comprises a ring of flood-lights suspended from the support structure and surrounding the mast immediately beneath such structure. The support structure comprises three circumferentially spaced latching mechanisms of the kind illustrated, arranged to cooperate in supporting the flood-lighting system.

The illustrated part of the support structure includes a vertical tubular member 4 having a pulley 5 mounted centrally near to its top end for receiving

a cable 6 from which the carrying member 2 is suspended. The flood-lighting system is in turn suspended from the bottom end of the carrying member 2. The three cables 6 of the three cooperating latching mechanisms are combined together centrally of the support structure and extend down the mast to ground level for operation either manually or by means of a suitable motor-driven winch.

The latching member 3 is mounted on the carrying member 2 by a pivot pin 7 and is formed with a nose 8 on one side of the pivot pin for latching engagement with the tubular member 4 of the support structure, and a counterweight portion 9 on the other side of the pivot.

Opposite side wall portions 10 and 11 of the tubular member 4 are formed respectively with a first slot 12 closed at its top and bottom ends and a second slot 13 closed at its top end but open at its bottom end.

Referring now to Figure 2 to 5, the latching process begins when the load has been hoisted to an initial unlatched position in which the latching mechanism is in the condition shown in Figure 2. A first upward movement of the carrying member 2, as it is further raised relative to the support structure by means of the cable 6, causes a protrusion 14 forming part of the nose 8 of the latching member to engage with the lower end of the side wall portion 10 of the tubular member 4 so that the latching member is swung in the clockwise direction, as illustrated in Figure 3. A further increment of the said first upward movement of the carrying member to the Figure 4 position causes the protrusion 14 of the nose 8 to engage in the slot 12 and then, upon a slight lowering movement of the carrying member, to engage in latching fashion with the bottom end of the slot, with the main body of the nose abutting face to face with the inside of the wall 10. The cable 6 can now be released and the load is supported by the engagement of the protrusion 14 against the bottom end of the slot 12, together with the engagement of the upper end of the carrying member against the side wall portion 11 of the tubular member above the slot 13, and by the engagement of the nose body with the inside of the wall portion 10 as just mentioned. It will thus be appreciated that the aforementioned first upward movement of the carrying member 2 relative to the support structure causes the latching member 3 to automatically make latching engagement with the support structure, so that the load is now supported from the support structure and the cable 6 is unloaded.

To unlatch the mechanism, the carrying member 2 is raised from the position shown in Figure 5 by means of the cable 6 so that undergoes a second upward movement through the Figure 6 position to an automatic release position shown in Figure 7. At this point the nose 8 of the latching member 3 disengages from the bottom end of the slot 12 and the counterweight portion 9 of the latching member acts on it to cause the latching member to swing automatically in the anticlockwise direction, into a released position shown in Figure 7. Then, when the carrying member is lowered, the latching member is enabled to move past the lower end of the wall portion 10 of the tubular member 4, by a further anticlockwise movement illustrated in Figures 8 and 9, so that the latching member eventually becomes free of the tubular member and thus returns to the position shown in Figures 2 and 9.

If, upon the second upward movement of the carrying member, the latching member does not move automatically to its released position as described above, because of the presence of some foreign matter blocking its movement, these circumstances will become apparent to an operator when he allows the carrying member to move downwards after having raised it to the Figure 6 position, because the mechanism will lock once again. In these circumstances the mechanism can be positively released by a further upward movement of the carrying member from the position shown in Figure 7 to a positive release position in which the counter-weight portion 9 of the latching member abuts against the closed top end of the slot 13 in the tubular member wall portion 11, thus forcing the latching member to rotate in the anticlockwise direction and removing the obstruction. The latching member then assumes the Figure 8 position, as desired, and the load can be lowered.

CLAIMS

1. A remotely operable latching mechanism for securing a load to a support against the influence of gravity and for releasing it when desired, such mechanism comprising a stationary support structure, a movable carrying member which is raisable and lowerable relative to the said support structure from a remote location and is adapted to support the said load, and a latching member pivotally mounted on the said carrying member and engageable with the said support structure, the latching member being arranged (a) to make automatic load-supporting latching engagement with the support structure upon a first upward movement of the carrying member relative to the support structure from an initial unlatched position to a latching position, (b) to swing automatically to a released position relative to the support structure upon a second such upward movement of the carrying member from the said latching position to an automatic release position and (c) to be positively moved to said released position by abutment with the support structure upon a third upward movement of the carrying member from the said automatic release position to a positive release position, if the latching member has not already moved automatically to its released position as aforesaid.

2. A latching mechanism as claimed in claim 1, wherein the said latching member has a latching nose on one side of its pivotal mounting for latching engagement with the support structure, and a counterweight portion on the other side of its pivotal mounting for automatically swinging the said nose to said released position.

3. A latching mechanism as claimed in claim 2,

wherein the said support structure is formed with a first vertical slot, closed at its lower end, for receiving the said nose of the latching member, the said nose engaging the lower end of the slot in its said latching position.

4. A latching mechanism as claimed in claim 3, wherein the said support structure is formed with a second vertical slot, closed at its upper end, for receiving the said counterweight portion of the latching member, the said counterweight portion abutting the upper end of the said second slot upon said third movement of the carrying member.

5. A latching mechanism as claimed in claim 4, wherein the said first and second slots are formed in opposite wall portions of a vertical tubular member forming part of the said support structure, in which tubular member the said carrying member is raisable and lowerable as aforesaid.

6. A latching mechanism as claimed in any preceding claim, wherein the said carrying member is adapted to have the said load suspended therefrom.

7. A latching mechanism claimed in claim 6, including at least one pulley on the said support structure for receiving a cable or the like for raising and lowering the said carrying member.

8. A latching mechanism substantially as hereinbefore described with reference to the accompanying drawings.

9. Apparatus including a latching mechanism as claimed in any preceding claim, comprising a mast or tower incorporating the said support structure of the latching mechanism at an elevated position thereon.

10. Apparatus as claimed in claim 9, wherein the said mast or tower includes a plurality of said latching mechanisms adapted to support a common load.

11. Apparatus as claimed in claim 10, wherein the said load is a flood-lighting system.

Printed for Her Majesty's Stationery Office by Courier Press, Leamington Spa. 3/1986. Demand No. 8817443.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.